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In Re Application Of: **Geffken et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/745,047	12/20/00	Soward, Ida M.	2822

Invention: **CONTACT CAPPING LOCAL INTERCONNECT**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Robert M. Geffken et al.	)	Examiner: Soward, Ida M.
Serial No.: 09/745,047	)	Art Unit: 2822
Filed: 12/20/00	)	
For: **CONTACT CAPPING LOCAL INTERCONNECT**	)	

Commissioner for Patents
Washington, D.C. 20231

BRIEF OF APPELLANTS

This Appeal Brief, pursuant to the Notice of Appeal filed February 20, 2003, is an appeal from the rejection of the Examiner dated November 20, 2002.

REAL PARTY IN INTEREST

International Business Machines, Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-14 and 29-42 are currently pending. Claims 1-14 and 29-42 have been rejected. This Brief is in support of an appeal from the rejection of claims 1-14 and 29-42.

STATUS OF AMENDMENTS

There are no After-Final Amendments which have not been entered.

SUMMARY OF INVENTION

The present invention discloses an electronic structure (11) in FIGS. 8-10, and description thereof in the specification in conjunction with the description of FIGS. 1, 2, 3A-3E, and 4-10, which describe the method steps and intermediate structure which result in FIGS. 8-10.

The electronic structure comprises a substrate layer (12) that includes a first electronic device (20). The electronic structure may include a passivating layer (48) on the substrate layer and in mechanical contact with the substrate layer, wherein the passivating layer is on the first electronic device and is in mechanical contact with the first electronic device. See FIGS. 8-10; FIG. 1 and specification: page 1, lines 10-11 and page 2, lines 6-15. The electronic structure further comprises a first insulative layer (14) on the passivating layer and in mechanical contact with the passivating layer. See FIGS. 8-10; FIG. 1 and specification on page 2, lines 6-8. The electronic structure further comprises a first damascene conductive wire/stud (61) having a lower portion in the first insulative layer and an upper portion above the first insulative layer. See FIGS. 8-10; FIG. 4 and specification on page 11, lines 3-10. The electronic structure further comprises a subtractive etch metallic cap (78) on the upper portion of the first damascene conductive wire/stud and in conductive contact with the first damascene conductive wire/stud. See FIGS. 8-10; FIG. 6 and specification on page 13, lines 15-17. The electronic structure further comprises a second insulative layer (80) on the first insulative layer, wherein the second insulative layer covers the subtractive etch metallic cap. See FIGS. 8-10; FIG. 7 and

specification on page 14, lines 18-19. The electronic structure further comprises a damascene conductive wiring line structure (90) within the second insulative layer such that the damascene conductive wiring line structure is above the subtractive etch metallic cap and is conductively coupled to the subtractive etch metallic cap. See FIGS. 8-10; specification, page 15, lines 13-17.

The passivating layer may comprise a material selected from the group consisting of silicon nitride and silicon carbide. See specification, page 2, lines 6-8. The first insulation layer may comprise a material selected from the group consisting of phososilicate glass and borophososilicate glass. See specification, page 2, lines 1-4. The first insulation layer may have a thickness between about 0.2 microns and about 1.5 microns. See specification, page 2, lines 4-6.

The lower portion of the first damascene conductive wire/stud may be conductively coupled to a first portion (gate 23) of the first electronic device. See FIGS. 8-10; FIG. 3A and specification on page 3, lines 5-7.

In addition to the first damascene conductive wire/stud being conductively coupled to a first portion of the first electronic device, the electronic structure may further comprise a second damascene conductive wire/stud (62) having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to a second portion (drain 22) of the first electronic device, and wherein the subtractive etch metallic cap is in conductive contact with the second damascene conductive wire/stud. See FIGS. 8-10; FIG. 5 and specification on page 14, lines 1-3.. Furthermore, the first electronic device may be a field effect transistor (FET), wherein the first portion of the first electronic device includes a gate (23) of the FET, and wherein the second

portion of the first electronic device may be a drain (22) of the FET. See FIGS. 8-10; FIG. 1. Alternatively, the second portion of the first electronic device may be a source (21) of the FET. See Specification, page 4, lines 14-17.

In addition to the first damascene conductive wire/stud being conductively coupled to a first portion of the first electronic device, the first electronic device may be an MOS capacitor, a resistor, an inductor, a charged coupled device, or a light emitting diode. See Specification, page 11, line 19 - page 12, line 1.

In addition to the first damascene conductive wire/stud being conductively coupled to a first portion of the first electronic device, the electronic structure may further comprise a second electronic device (30), and wherein the electronic structure further comprises: a second damascene conductive wire/stud (63) having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to the second electronic device; and a damascene conductive wiring line (92) within the second insulative layer, wherein the damascene conductive wiring line is above the second damascene conductive wire/stud and is insulatively isolated from the second damascene conductive wire/stud; in addition, the electronic structure may further comprise a second subtractive etch metallic cap (79) on the upper portion of the second damascene conductive wire/stud and in conductive contact with the second damascene conductive wire/stud. See FIG. 8; specification, page 16, lines 3-7.

The substrate may include a shallow trench isolation (STI) (46), and wherein the lower portion of the first damascene conductive wire/stud (59) is on the STI. See FIG. 10; page 18, line 22 - page 19, line 1.

In addition to the first damascene conductive wire/stud being conductively coupled to a first portion of the first electronic device, the electronic structure may further comprise: a second subtractive etch metallic cap (79) on the first insulative layer; and a dual damascene (320) within the second insulative layer such that the dual damascene is above the second subtractive etch metallic cap and is conductively coupled to the second subtractive etch metallic cap. See FIG 9; specification on page 17, lines 15-21.

The subtractive etch metallic cap may have a thickness between about 50 nm and about 300 nm. See specification, page 13, lines 8-10.

The subtractive etch metallic cap may include an electrically conductive material selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, and combinations thereof. See specification, page 12, lines 19-21.

The first damascene conductive wire/stud may include an internal seam or void (71) oriented lengthwise within the first damascene conductive wire/stud. See specification, page 12, lines 19-21. See FIGS. 8-10; specification on page 16, lines 14-17.

The subtractive etch metallic cap may includes a first electrically conductive material, and wherein the first damascene conductive wire/stud includes a second electrically conductive material which differs from the first electrically conductive material. See specification, page 14, lines 9-17.

The first electrically conductive material may be selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, alloys thereof, and combinations thereof, and

wherein the second electrically conductive material is selected from the group consisting of polysilicon, tungsten, aluminum, copper, tantalum, and titanium nitride, alloys thereof, and combinations thereof. See specification, page 12, lines 19-21; page 14, lines 12-14.

The distance between a top surface of the first damascene conductive wire/stud and a top surface of the first insulative layer may be between about 100 nm and about 400 nm. See specification, page 11, lines 7-12.

The first insulative layer may have a thickness that is greater than 250 nm. See specification, page 11, lines 12-15.

A passivating film (84) may be disposed between the first insulative layer and the second insulative layer, and the passivating film may be in contact with the subtractive etch metallic cap See FIGS. 8-10; FIG. 7 and specification on page 15, lines 2-4.

The damascene conductive wiring line structure may comprise a damascene conductive wiring line (91) and a conductive liner (94) formed on sides of the damascene conductive wiring line. FIG. 8; specification, page 15, lines 17-19.

The damascene conductive wiring line structure together with the subtractive etch mechanical cap and the first damascene conductive wire/stud may be adapted to collectively couple the first electronic device to other conductive structure in interlevel dielectric layers which are at or above the damascene conductive wiring line structure. FIG. 8; specification, page 15, line 23 - page 16, line 7.

ISSUES

1. Whether claims 1-7, 9-14, 29, 32-39 and 42 under 35 U.S.C. §103(a) are unpatentable over

prior art Figures 1-3E in view of Farooq et al. (U.S. Patent 5,705,857).

2. Whether claim 8 under 35 U.S.C. §103(a) is unpatentable over prior art Figures 1-3E in view of Farooq et al. (U.S. Patent 5,705,857), and further in view of Cheek et al. (U.S. Patent 6,018,180).

3. Whether claims 30-31 and 40-41 under 35 U.S.C. §103(a) are unpatentable over prior art Figures 1-3E in view of Farooq et al. (U.S. Patent 5,705,857), and further in view of Christensen et al. (U.S. Patent 6,121,659).

GROUPING OF CLAIMS

The claims are grouped as shown in Table 1:

Table 1

Group	Issue	Claims	Do Claims of Group Rise or Fall Together?
1	1	1-4, 6-7, 12, 34, 38-39, 42	Yes
2	1	11, 14, 29	Yes
3	1	36-37	Yes
4	1	5, 9-10, 13, 32-33, 35	No
5	2	8	Yes
6	3	30	Yes
7	3	31, 40-41	Yes

Groups 1-4 includes the claims corresponding to Issue 1. Group 5 includes the claim corresponding to Issue 2. Groups 6-7 includes the claims corresponding to Issue 3.

The claims of Groups 1-4 (associated with Issue 1) do not rise and fall together with the claims of Group 5 (associated with Issue 2), because the claims of Groups 1-4 and the claims of Group 5 are rejected over different combinations of references. The claims of Groups 1-4 (associated with Issue 1) do not rise and fall together with the claims of Groups 6-7 (associated with Issue 3), because the claims of Groups 1-4 and the claims of Groups 6-7 are rejected over different combinations of references. The claims of Group 5 (associated with Issue 2) do not rise and fall together with the claims of Groups 6-7 (associated with Issue 3), because the claims of Group 5 and the claims of Groups 6-7 are rejected over different combinations of references.

Claims of Groups 1-4

Table 1 shows that: the claims of Group 1 stand and fall together; the claims of Group 2 stand and fall together; and the claims of Group 3 stand and fall together.

The claims of Group 4 do not stand and fall together, as shown in Table 1, because each of claims 5, 9-10, 13, 32-33, and 35 in Group 4 raises a unique issue not raised by any of the other claims in Group 4.

Claim 5 raises the unique issue of whether the cited references teach or suggest the following feature of claim 5: "wherein the first electronic device is selected from the group consisting of an MOS capacitor, a resistor, an inductor, a charged coupled device, and a light emitting diode".

Claim 9 raises the unique issue of whether the cited references teach or suggest the following feature of claim 9: "a second subtractive etch metallic cap on the first insulative layer; and a dual damascene within the second insulative layer such that the dual damascene is above

the second subtractive etch metallic cap and is conductively coupled to the second subtractive etch metallic cap".

Claim 10 raises the unique issue of whether the cited references teach or suggest the following feature of claim 10: "wherein the subtractive etch metallic cap has a thickness between about 50 nm and about 300 nm".

Claim 13 raises the unique issue of whether the cited references can be combined in relation to the following feature of claim 13: "wherein the first damascene conductive wire/stud includes a second electrically conductive material which differs from the first electrically conductive material".

Claim 32 raises the unique issue of whether the cited references teach or suggest the following feature of claim 32: "a passivating film disposed between the first insulative layer and the second insulative layer".

Claim 33 raises the unique issue of whether the cited references teach or suggest the following feature of claim 33: "wherein the passivating film [between the first and second insulating layers] is in contact with the subtractive etch metallic cap".

Claim 35 raises the unique issue of whether the cited references teach or suggest the following feature of claim 35: "wherein the damascene conductive wiring line structure together with the subtractive etch mechanical cap and the first damascene conductive wire/stud are adapted to collectively couple the first electronic device to other conductive structure in interlevel dielectric layers which are at or above the damascene conductive wiring line structure".

The claims of Group 2 do not rise and fall together with the claims of any of Groups 1, 3, and 4, because the claims of Group 2 raise the issue of whether the cited references can be

combined in relation to a unique feature in the claims of Group 2 wherein said unique feature of Group 2 is not pertinent to any of the claims of Groups 1, 3, and 4, said unique feature in the claims of Group 2 relating to the non-obviousness of electrically conductive materials comprised by the subtractive etch metallic caps.

The claims of Group 3 do not rise and fall together with the claims of any of Groups 1, 2, and 4, because the claims of Group 3 raise the issue of whether the cited references teach or suggest a unique feature in the claims of Group 3 wherein said unique feature of Group 3 is not pertinent to any of the claims of Groups 1, 2, and 4, said unique feature in the claims of Group 3 being: "wherein the damascene conductive wiring line structure comprises a dual damascene in contact with the subtractive etch metallic cap".

The claims of Group 4 do not rise and fall together with the claims of any of Groups 1, 2, and 3, because the claims 5, 9-10, 13, 32-33, and 35 in Group 4 raise issues or features (recited *supra*) which do not arise in connection with any of the claims of Groups 1, 2, and 3.

Claims of Group 5

Group 5 consists of only one claim, namely claim 8.

Claims of Groups 6-7

Group 6 consists of only one claim, namely claim 30.

Table 1 shows that: the claims of Group 7 stand and fall together.

The claim of Group 6 does not rise and fall together with the claim Group 7, because the claim of Group 6 raises the issue of whether the cited references teach or suggest a unique feature

in the claim of Group 6 wherein said unique feature of Group 6 is not pertinent to any of the claims of Group 7, said unique feature in the claim of Group 6 being: "wherein the distance between a top surface of the first damascene conductive wire/stud and a top surface of the first insulative layer is between about 100 nm and about 400 nm".

ARGUMENT

Issue 1
CLAIMS 1-7, 9-14, 29, 32-39 AND 42 UNDER 35 U.S.C. §103(A) ARE NOT UNPATENTABLE OVER PRIOR ART FIGURES 1-3E IN VIEW OF FAROOQ ET AL. (U.S. PATENT 5,705,857).

The Examiner rejected claims 1-7, 9-14, 29, 32-39 and 42 under 35 U.S.C. §103(a) as being unpatentable over prior art Figures 1-3E in view of Farooq et al. (5,705,857). The Examiner alleges that "Prior Art Figures 1-13E teach an electronic structure **10**, comprising: a substrate layer **12** that includes a first electronic device **20**; a passivation layer **48** on the substrate layer an in mechanical contact with the substrate layer, wherein the passivating layer is on the first electronic device and is in mechanical contact with the first electronic device; a first insulative layer **49** on the passivating layer and in mechanical contact with the passivating layer; a first damascene conductive wire/stud **61** having a lower portion in the first insulative layer and an upper portion above the first insulative layer; a second insulative layer **7** on the first insulative layer; a damascene conductive wiring line structure **8** within the second insulative layer; the lower portion of the first damascene conductive wire/stud is conductively coupled to a first portion **23** of the first electronic device; a second damascene conductive wire/stud **62** having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled

to a second portion **22** of the first electronic device; the first electronic device being a MOS field effect transistor (FET), wherein the first portion of the first electronic device includes a gate of the FET, and wherein the second portion of the first electronic device is selected from the group consisting of a source of the FET and a drain of the FET; the substrate layer further comprising a second electronic device **30**, and wherein the electronic structure further comprising: a second damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to the second electronic device; and a damascene conductive wiring line **67** within the second insulative layer, wherein the damascene conductive wiring line is above the second damascene conductive wire/stud and is insulatively isolated from the second damascene conductive wire/stud; a shallow trench isolation (STI); an internal seam or void oriented lengthwise within the first damascene conductive wire/stud; and a conductive liner **68**. However, Prior Art Figures 1-3E fail to teach a metallic cap. Farooq et al. teach a metallic caps **23** (having a preferred thickness of about 0.100 to 1.000 microns) of an electrically conductive material selected from the group consisting of aluminum, chromium, cobalt, gold, nickel, palladium, platinum, silver, to name a few that is in contact with the upper portion of a conductive wire and is different from the conductive copper stud **18**; a dual damascene **28** within a second insulative layer (passivation) **30** (which covers metallic cap **23**) such that a dual damascene **128** is above the second metallic cap **23** and is conductively coupled to the second metallic cap; and a conductive wiring line structure **131** is above and in contact with metallic cap **23** (Figures 4-5, cols. 4-5, lines 9-67 and 1-36, respectively). Farooq et al. further teach Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability."

Claim 1

Appellants respectfully contend that claim 1 is not unpatentable over prior art Figures 1-3E in view of Farooq, because prior art FIGS. 1-3E in view of Farooq does not teach or suggest each and every feature of claim 1, and because the Examiner's argument for combining Farooq with the prior art FIGS. 1-3E is not persuasive.

As a first example of why prior art FIGS. 1-3E in view of Farooq do not teach or suggest each and every feature of claim 1, prior art FIGS. 1-3E in view of Farooq do not teach or suggest a first feature of: "a first damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer". The Examiner has identified the first damascene conductive wire/stud 61 and has incorrectly identified the first insulative layer 49 in prior art FIGS. 1-3E. Appellants note that reference numeral 49 does not represent a layer, as alleged by the Examiner, but instead represents an insulative material 49 comprised by insulative layer 14. Consequently, Appellants will treat insulative layer 14 as the assumed first insulative layer identified by the Examiner. FIG. 3A clearly shows that no portion of wire/stud 61 extends above the first insulative layer 14, as required by claim 1, since the top surface of the first insulative layer 14 coincides with the top surface of the wire/stud 61. In FIGS. 3B, 3D, and 3E, wire/stud 61 and first insulative layer 14 are the same geometrically as in FIG. 3A, so that FIGS. 3B, 3D, and 3E likewise clearly shows that no portion of wire/stud 61 extends above the first insulative layer 14, as required by claim 1. Therefore, based on the

Examiner's argument that the first damascene conductive wire/stud in claim 1 is represented by wire/stud 61, Appellant respectfully maintains that prior art FIGS. 1-3E do not teach or suggest said first feature of claim 1, since no portion of wire/stud 61 extends above the first insulative layer 14, as required by claim 1. Accordingly, Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness in relation to claim 1.

As a second example of why prior art FIGS. 1-3E in view of Farooq do not teach or suggest each and every feature of claim 1, prior art FIGS. 1-3E in view of Farooq do not teach or suggest a second feature of: "a damascene conductive wiring line structure **within** the second insulative layer...." The Examiner has identified in FIG. 5 of Farooq: the electrical interconnect 131 as the conductive wiring line structure, and the insulator layer 30 as the second insulative layer. However, FIG. 5 shows the electrical interconnect 131 as being above the insulator layer 30 and not as being within the insulator layer 30 as required by claim 1. Additionally, the Examiner has not even alleged that the electrical interconnect 131 is within the insulator layer 30 as required by claim 1. Because the Examiner did not even address the issue of the damascene conductive wiring line structure being within the second insulative layer, the rejection of claim 1 is improper. Alternatively, the Examiner has identified dual damascene 28 as being within the second insulative layer 30. Thus, if the Examiner is viewing dual damascene 28 as representing the damascene conductive wiring line structure of claim 1, then the rejection is improper because dual damascene 28 is not above the metallic cap 23 as required by claim 1. Thus, no matter how the Examiner's argument is interpreted, Farooq does not teach or suggest said second feature of claim 1. Accordingly, Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to said second feature of claim 1.

In addition, the rejection of claim 1 is improper because the Examiner alleges that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq". However, the Examiner provides no explanation of how to physically incorporate Farooq's metallic cap into the structure of prior art FIGS. 1-3E. Appellants maintain that it is physically impossible to incorporate Farooq's metallic cap into the structure of prior art FIGS. 1-3E without radically altering the structural features of prior art FIGS. 1-3E. For example, Farooq's metallic cap 23 is in direct contact with the top of the wire/stud 28, which is physically impossible to implement in prior art FIGS. 1-3E without destroying the direct contact in FIGS. 3B, 3D, and 3E between the wire/stud 61 and the conductive structure above wire/stud 61 in FIGS. 3B, 3D, and 3E. Furthermore, Farooq's metallic cap 23 totally covers sidewalls of the wire/stud, which is physically impossible to implement in prior art FIGS. 1-3E without destroying the physical contact between the insulation 49 and the wire/stud 61 in prior art FIGS. 1-3E. Farooq discloses that the sidewall covering by the metallic cap 23 is very important (see Farooq, col. 6, lines 14-19). In any event, the Examiner's failure to explain how to physically modify prior art FIGS. 1-3E to incorporate Farooq's metallic cap into the structure of prior art FIGS. 1-3E makes the rejection of FIG. 1 improper, because Appellants can do no more than speculate as to what structural modification the Examiner has in mind when stating that it would be obvious to incorporate Farooq's metallic cap into the structure of prior art FIGS. 1-3E. It is unreasonable to expect Appellants to respond to an undefined and unspecified manner in which Farooq's metallic cap is incorporated into the structure of prior art FIGS. 1-3E. Accordingly, Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness

with respect to claim 1.

In addition, the rejection of claim 1 is improper because the Examiner has not presented a persuasive argument for combining Farooq with the prior art FIGS. 1-3E in rejecting claim 1. The Examiner argues that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce **process variability**" (emphasis added). Appellants contend that the Examiner has not explained how modifying the structure of prior art FIGS. 1-3E would reduce process variability. The term "process variability" is vague and unclear as applied to prior art FIGS. 1-3E. The Examiner has not defined "process variability" with respect to prior art FIGS. 1-3E. The Examiner has not explained how "process variability" applies to claim 1 for combining Farooq with the prior art FIGS. 1-3E. It is unclear as to what the Examiner means by "process" inasmuch as claim 1 is a structure claim and not a process claim. Moreover, it is unclear as to what type of "variability" the Examiner has in mind in relation to "process"as applied to prior art FIGS. 1-3E. Furthermore, the Examiner's ambiguous reason for combining Farooq with the prior art FIGS. 1-3E is conclusory, since the Examiner has offered no argument whatsoever to show that adding a metallic cap to prior art FIGS. 1-3E would reduce process variability in relation to prior art FIGS. 1-3E. Appellants maintain that adding a metallic cap to prior art FIGS. 1-3E would add to process complexity and would therefore be likely to increase process variability with respect to prior art FIGS. 1-3E. Thus, Appellants maintain that the Examiner's stated reason for combining Farooq with the prior art of FIGS. 1-3E is not persuasive.

Also as to"process variability", the Examiner has relied on combining Farooq with the

prior art FIGS. 1-3E for three features of claim 1 relating to the subtractive etch metallic cap. The Examiner alleges that Farooq teaches each of said three features, and the Examiner therefore has the burden to prove that importation of each of said three features from Farooq into the prior art FIGS. 1-3E would reduce process variability. Appellants respectfully contend that the Examiner has not satisfied this burden of proof. The Examiner relies on Farooq for the following first relied-upon feature of claim 1: "a subtractive etch metallic cap on the upper portion of the first damascene conductive wire/stud and in conductive contact with the first damascene conductive wire/stud", and the Examiner has not made even a single argument to show that importation of said first relied-upon feature of claim 1 into the prior art FIGS. 1-3E would reduce process variability, so that the Examiner has not established a *prima facie* case of obviousness with respect to claim 1. The Examiner relies on Farooq for the following second relied-upon feature of claim 1: "wherein the second insulative layer covers the subtractive etch metallic cap", and the Examiner has not made even a single argument to show that importation of said second relied-upon feature of claim 1 into the prior art FIGS. 1-3E would reduce process variability, so that the Examiner has not established a *prima facie* case of obviousness with respect to claim 1. The Examiner relies on Farooq for the following third relied-upon feature of claim 1: "a damascene conductive wiring line structure within the second insulative layer such that the damascene conductive wiring line structure is above the subtractive etch metallic cap and is conductively coupled to the subtractive etch metallic cap", and the Examiner has not made even a single argument to show that importation of said third relied-upon feature of claim 1 into the prior art FIGS. 1-3E would reduce process variability, so that the Examiner has not established a *prima facie* case of obviousness with respect to claim 1. Accordingly, the rejection of claim 1 is

improper and should be reversed.

Also as to"process variability", Farooq does state anywhere that the presence of the metallic cap 23 reduces process variability as compared with the absence of the metallic cap 23. The only discussion in Farooq of how Farooq's invention might reduce process variability appears in col. 6, lines 52-58 which recites: "Similarly, in the case of plated copper lines, based on feature dimension and the nature of subsequent processing, it would not be necessary to reflow resist to ensure sidewall capping, making the process extremely attractive in terms of **reliability**, logistics and costs, since the plating operations are essentially completed in one sector before the part is moved out to the resist strip sector" (emphasis added). The preceding quote from Farooq is unrelated to the issue of whether having the metallic cap 23 reduces process variability, as compared with not having the metallic cap 23. Accordingly, Appellants again respectfully maintain that the Examiner's stated reason for combining Farooq with the prior art of FIGS. 1-3E is not persuasive. Accordingly, the Examiner has not established a *prima facie* case of obviousness with respect to claim 1.

Claim 2

Since claim 2 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 2 is not unpatentable under 35 U.S.C. §103(a).

Claim 3

Since claim 3 depends from claim 1, which Appellants have argued *supra* to be

patentable under 35 U.S.C. §103(a), Appellants maintain that claim 3 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "a second damascene conductive wire/stud having ... an upper portion above the first insulative layer" as required by claim 3. The Examiner's allegation that conductive wire/stud 62 has an upper portion above the first insulative layer 14 is incorrect, since the top surface of conductive wire/stud 62 coincides with the top surface of first insulative layer 14, as may be seen in FIG. 3A. Thus claim 3 is not unpatentable under 35 U.S.C. §103(a).

Claim 4

Since claim 4 depends from claims 1 and 3, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 4 is not unpatentable under 35 U.S.C. §103(a).

Claim 5

Since claim 5 depends from claims 1 and 2, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 5 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the first electronic device is selected from the group consisting of an MOS capacitor, a resistor, an inductor, a charged coupled device, and a light emitting diode" as required by claim 5. The Examiner's allegation that conductive FET 20 (in prior art FIGS. 1-3E) is a MOS capacitor is incorrect, since prior art FIGS. 1-3E and the description thereof do not disclose a metal oxide as is required in a MOS capacitor. Thus claim 5 is not unpatentable under 35 U.S.C.

§103(a).

Claim 6

Since claim 6 depends from claims 1 and 2, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 6 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "a second damascene conductive wire/stud having ... an upper portion above the first insulative layer" as required by claim 6. The Examiner's allegation that conductive wire/stud 63 has an upper portion above the first insulative layer 14 is incorrect, since the top surface of conductive wire/stud 63 coincides with the top surface of first insulative layer 14, as may be seen in FIG. 3A. Thus claim 6 is not unpatentable under 35 U.S.C. §103(a).

Claim 7

Since claim 7 depends from claims 1 and 6, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 7 is not unpatentable under 35 U.S.C. §103(a).

Claim 9

Since claim 9 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 9 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "a second subtractive etch metallic cap on the first insulative layer; and a dual damascene within

the second insulative layer such that the dual damascene is above the second subtractive etch metallic cap and is conductively coupled to the second subtractive etch metallic cap" as required by claim 9. Prior art FIGS. 1-3E do not disclose a dual damascene, and the Examiner has not made a persuasive argument that Farooq discloses a dual damascene that is both within the second insulative layer and is above the metallic cap 23. Thus claim 9 is not unpatentable under 35 U.S.C. §103(a).

Claim 10

Since claim 10 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C: §103(a), Appellants maintain that claim 10 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the subtractive etch metallic cap has a thickness between about 50 nm and about 300 nm" as required by claim 10. The Examiner has not even alleged that prior art FIGS. 1-3E in view of Farooq teach or suggest "wherein the subtractive etch metallic cap has a thickness between about 50 nm and about 300 nm" as required by claim 10. Indeed, the final office action mailed 11/20/2002 is totally silent as to the preceding feature of claim 10. Because the Examiner did not even address the issue of "wherein the subtractive etch metallic cap has a thickness between about 50 nm and about 300 nm", the rejection of claim 10 is improper, and Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 10. Thus claim 10 is not unpatentable under 35 U.S.C. §103(a).

Claim 11

Since claim 11 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 11 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the subtractive etch metallic cap includes an electrically conductive material selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, and combinations thereof" as required by claim 11. The Examiner's alleges that "Farooq et al. teach a metallic caps 23 ... of an electrically conductive material selected from the group consisting of aluminum, chromium, cobalt, gold, nickel, palladium, platinum, silver, ...", and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the choice of any of Farooq's electrically conductive materials for the metallic cap 23 would reduce process variability. Thus, the Examiner's argument for combining Farooq with prior art FIGS. 1-3E for claim 11 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 11. Thus, claim 11 is not unpatentable under 35 U.S.C. §103(a).

Claim 12

Since claim 12 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 12 is not unpatentable under

35 U.S.C. §103(a).

Claim 13

Since claim 13 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 13 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the first damascene conductive wire/stud includes a second electrically conductive material which differs from the first electrically conductive material" as required by claim 13. The Examiner's alleges that "Farooq et al. teach a metallic caps 23 ... of an electrically conductive material ... and is different from the conductive copper stud **18**", and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the fact that the second electrically conductive material differs from the first electrically conductive material would reduce process variability. Thus, the Examiner's argument for combining Farooq with prior art FIGS. 1-3E for claim 13 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 13. Thus, claim 13 is not unpatentable under 35 U.S.C. §103(a).

Claim 14

Since claim 14 depends from claims 1 and 13, which Appellants have argued *supra* to be

patentable under 35 U.S.C. §103(a), Appellants maintain that claim 14 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the first electrically conductive material is selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, alloys thereof, and combinations thereof, and wherein the second electrically conductive material is selected from the group consisting of polysilicon, tungsten, aluminum, copper, tantalum, and titanium nitride, alloys thereof, and combinations thereof" as required by claim 14. The Examiner's alleges that "Farooq et al. teach a metallic caps 23 ... of an electrically conductive material selected from the group consisting of aluminum, chromium, cobalt, gold, nickel, palladium, platinum, silver, ...", and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the choice of any of Farooq's electrically conductive materials for the first and second electrically conductive materials for claim 14 would reduce process variability. Thus, the Examiner's argument for combining Farooq with prior art FIGS. 1-3E for claim 14 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 14. Thus, claim 14 is not unpatentable under 35 U.S.C. §103(a).

Claim 29

Since claim 29 depends from claim 1, which Appellants have argued *supra* to be

patentable under 35 U.S.C. §103(a), Appellants maintain that claim 29 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the subtractive etch metallic cap includes an electrically conductive material selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, copper, and combinations thereof" as required by claim 29. The Examiner's alleges that "Farooq et al. teach a metallic caps 23 ... of an electrically conductive material selected from the group consisting of aluminum, chromium, cobalt, gold, nickel, palladium, platinum, silver, ...", and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the choice of any of Farooq's electrically conductive materials for the metallic cap 23 would reduce process variability. Thus, the Examiner's argument for combining Farooq with related art FIGS. 1-3E for claim 29 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 29. Thus, claim 29 is not unpatentable under 35 U.S.C. §103(a).

Claim 32

Since claim 32 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 32 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest that the electronic structure further comprises "a passivating film disposed between the

first insulative layer and the second insulative layer" as required by claim 32. Related art FIGS. 1-3E do not disclose "a passivating film disposed between the first insulative layer 14 and the second insulative layer 7". Moreover, the Examiner has not made any argument that related art FIGS. 1-3E in view of Farooq teach or suggest the preceding feature of claim 32. Indeed, the final office action mailed 11/20/2002 is totally silent as to the preceding feature of claim 32. Because the Examiner did not even address the issue of "a passivating film disposed between the first insulative layer and the second insulative layer", the rejection of claim 32 is improper, and Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 32. Thus claim 32 is not unpatentable under 35 U.S.C. §103(a).

Claim 33

Since claim 33 depends from claims 1 and 32, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 33 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest that the electronic structure further comprises "wherein the passivating film [between the first and second insulating layers] is in contact with the subtractive etch metallic cap" as required by claim 33. Related art FIGS. 1-3E in view of Farooq do not teach or suggest the preceding feature of claim 33. Moreover, the Examiner has not made any argument that related art FIGS. 1-3E in view of Farooq teach or suggest the preceding feature of claim 33. Indeed, the final office action mailed 11/20/2002 is totally silent as to the preceding feature of claim 33. Because the Examiner did not even address the issue of "wherein the passivating film [between the first

and second insulating layers] is in contact with the subtractive etch metallic cap", the rejection of claim 33 is improper, and Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 33. Thus claim 33 is not unpatentable under 35 U.S.C. §103(a).

Claim 34

Since claim 34 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 34 is not unpatentable under 35 U.S.C. §103(a).

Claim 35

Since claim 35 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 35 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest that the electronic structure further comprises "wherein the damascene conductive wiring line structure together with the subtractive etch mechanical cap and the first damascene conductive wire/stud are adapted to collectively couple the first electronic device to other conductive structure in interlevel dielectric layers which are at or above the damascene conductive wiring line structure" as required by claim 35. Related art FIGS. 1-3E in view of Farooq do not teach or suggest the preceding feature of claim 35. Moreover, the Examiner has not made any argument that related art FIGS. 1-3E in view of Farooq teach or suggest the preceding feature of claim 35. Indeed, the final office action mailed 11/20/2002 is totally silent

as to the preceding feature of claim 35. Because the Examiner did not even address the preceding issue of claim 35, the rejection of claim 35 is improper, and Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 35. Thus claim 35 is not unpatentable under 35 U.S.C. §103(a).

Claim 36

Since claim 36 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 36 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the damascene conductive wiring line structure comprises a dual damascene in contact with the subtractive etch metallic cap" as required by claim 36. The Examiner's alleges that Farooq teaches the preceding feature of claim 36, and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the preceding feature of claim 36 would reduce process variability. Thus, the Examiner's argument for combining Farooq with related art FIGS. 1-3E for claim 36 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 36. Thus, claim 36 is not unpatentable under 35 U.S.C. §103(a).

Claim 37

Since claim 36 depends from claims 1 and 3, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 37 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the damascene conductive wiring line structure comprises a dual damascene in contact with the subtractive etch metallic cap" as required by claim 37. The Examiner's alleges that Farooq teaches the preceding feature of claim 37, and the Examiner argued that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of Prior Art Figures 1-3E with the metallic cap of Farooq et al. to reduce process variability". However, the Examiner provided no argument to support the allegation that the preceding feature of claim 37 would reduce process variability. Thus, the Examiner's argument for combining Farooq with related art FIGS. 1-3E for claim 37 is conclusory and not persuasive. Appellants respectfully maintain that the Examiner has not established a *prima facie* case of obviousness with respect to the preceding feature in claim 37. Thus, claim 37 is not unpatentable under 35 U.S.C. §103(a).

Claim 38

Since claim 38 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 38 is not unpatentable under 35 U.S.C. §103(a).

Claim 39

Since claim 39 depends from claim 1, which Appellants have argued *supra* to be

patentable under 35 U.S.C. §103(a), Appellants maintain that claim 39 is not unpatentable under 35 U.S.C. §103(a).

Claim 42

Appellants respectfully contend that claim 42 is not unpatentable over prior art Figures 1-3E in view of Farooq, because prior art FIGS. 1-3E in view of Farooq does not teach or suggest each and every feature of claim 42, and because the Examiner's argument for combining Farooq with the prior art FIGS. 1-3E is not persuasive, based on the same arguments presented by Appellants *supra* in conjunction with claim 1.

Issue 2
CLAIM 8 UNDER 35 U.S.C. §103(A) ARE NOT UNPATENTABLE OVER PRIOR ART FIGURES 1-3E IN VIEW OF FAROOQ ET AL. (U.S. PATENT 5,705,857), AND FURTHER IN VIEW OF CHEEK ET AL. (U.S. PATENT 6,018,180).

The Examiner rejected claim 8 under 35 U.S.C. §103(a) as being unpatentable over prior art Figures 1-3E and Farooq et al. (5,705,857) as applied to claim 1 above, and further in view of Cheek et al. (6,018,180).

Since claim 8 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 8 is not unpatentable under 35 U.S.C. §103(a). Additionally, prior art FIGS. 1-3E in view of Farooq do not teach or suggest "wherein the lower portion of the first damascene conductive wire/stud is on the STI" as required by claim 8. The Examiner's alleges that "Cheek et al. teach a lower portion of a conductive stud **470** is on the STI **220** (Figure 12, col. 8, lines 9-43). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the structure of

Prior Art Figures 1-3E and the metallic cap of Farooq et al. with the STI of Cheek et al. to obtain a higher yield".

In response, Appellants contend that in prior art FIGS. 1-3E, the conductive wire/stud serves as a conductive contact to a FET. However, placing the conductive wire/stud on the STI in prior art FIGS. 1-3E would require either eliminating the FET, or radically changing the geometrical relationship between the conductive wire/stud, the FET, and the STI, which would not be obvious to do. For example, it is not obvious to have the conductive wire/stud 61 placed on the STI 26 in prior art FIG. 3B. Accordingly, the Examiner has not established a *prima facie* case of obviousness in relation to claim 8. Thus, claim 8 is not unpatentable under 35 U.S.C. §103(a).

Additionally, the Examiner's argument for incorporating Cheek's conductive stud 470 on the STI 220 into prior art FIGS. 1-3E, namely to obtain a higher yield, is ambiguous. Appellants seek clarification of the following issues: 1) to obtain a higher yield of what? (i.e., what are we obtaining a higher yield of?); 2) higher than what? (i.e., what is the standard for comparison to which "higher" pertains?). Until the preceding questions are answered, Appellant has no idea what the Examiner is talking about when reciting "to obtain a higher yield".

Moreover, the Examiner has not provided any argument to support the Examiner's contention that incorporating Cheek's conductive stud 470 on the STI 220 prior art FIGS. 1-3E, would result in a "higher yield."

Therefore, the Examiner has not presented a persuasive argument for combining Cheek with prior art FIGS. 1-3E. Accordingly, the Examiner has not established a *prima facie* case of obviousness in relation to claim 8. Thus, claim 8 is not unpatentable under 35 U.S.C. §103(a).

Issue 3

CLAIMS 30-31 AND 40-41 UNDER 35 U.S.C. §103(A) ARE NOT UNPATENTABLE OVER PRIOR ART FIGURES 1-3E IN VIEW OF FAROOQ ET AL. (U.S. PATENT 5,705,857), AND FURTHER IN VIEW OF CHRISTENSEN ET AL. (U.S. PATENT 6,121,659).

The Examiner rejected claims 30-31 and 40- 41 under 35 U.S.C. §103(a) as being unpatentable over prior art Figures 1-3E and Farooq et al. (5,705,857) as applied to claims 1-7, 9-14, 29, 32-39 and 42 above, and further in view of Christensen et al. (6,121,659).

Claim 30

Since claim 30 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 30 is not unpatentable under 35 U.S.C. §103(a). Additionally, related art FIGS. 1-3E in view of Farooq do not teach or suggest that the electronic structure further comprises "wherein the distance between a top surface of the first damascene conductive wire/stud and a top surface of the first insulative layer is between about 100 nm and about 400 nm." as required by claim 30. The Examiner alleges that "Christensen et al, teach an insulative layer thickness that is greater then 250 nm [0.2 to 0.7 microns] (col. 6, lines 18-28). Given dimensions by Christensen et al. it is within the level of ordinary skill for the distance between a top surface of the wire/stud and a top surface of the insulative layer to fall between about 100 nm and about 400 nm ." In response, Appellants respectfully maintain that the preceding analysis by the Examiner is arbitrary and without any reasonable foundation, since the Examiner has provided no basis for assuming a relationship between the thickness of the first insulative layer and the distance between the top surface of the first damascene conductive wire/stud and the top surface of the first insulative layer. Thus, the

rejection of claim 30 under 35 U.S.C. §103(a) is improper and should be reversed.

Claim 31

Since claim 31 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 31 is not unpatentable under 35 U.S.C. §103(a).

Claim 40

Since claim 40 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 40 is not unpatentable under 35 U.S.C. §103(a).

Claim 41

Appellants respectfully contend that claim 41 is not unpatentable over prior art Figures 1-3E in view of Farooq and further in view of Christensen, because prior art FIGS. 1-3E in view of Farooq and further in view of Christensen does not teach or suggest each and every feature of claim 41, and because the Examiner's argument for combining Farooq with the prior art FIGS. 1-3E is not persuasive, based on the same arguments presented by Appellants *supra* in conjunction with claim 1.

SUMMARY

In summary, Appellants respectfully request reversal of the rejection under 35 U.S.C. §103(a) of claims 1-14 and 29-42.

Respectfully submitted,

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APPENDIX - CLAIMS ON APPEAL

1. An electronic structure, comprising:

a substrate layer that includes a first electronic device;

a passivating layer on the substrate layer and in mechanical contact with the substrate layer, wherein the passivating layer is on the first electronic device and is in mechanical contact with the first electronic device;

a first insulative layer on the passivating layer and in mechanical contact with the passivating layer;

a first damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer;

a subtractive etch metallic cap on the upper portion of the first damascene conductive wire/stud and in conductive contact with the first damascene conductive wire/stud;

a second insulative layer on the first insulative layer, wherein the second insulative layer covers the subtractive etch metallic cap; and

a damascene conductive wiring line structure within the second insulative layer such that the damascene conductive wiring line structure is above the subtractive etch metallic cap and is conductively coupled to the subtractive etch metallic cap.

2. The electronic structure of claim 1, wherein the lower portion of the first damascene conductive wire/stud is conductively coupled to a first portion of the first electronic device.

3. The electronic structure of claim 2, further comprising a second damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to a second portion of the first electronic device, and wherein the subtractive etch metallic cap is in conductive contact with the second damascene conductive wire/stud.

4. The electronic structure of claim 3, wherein the first electronic device is a field effect transistor (FET), wherein the first portion of the first electronic device includes a gate of the FET, and wherein the second portion of the first electronic device is selected from the group consisting of a source of the FET and a drain of the FET.

5. The electronic structure of claim 2, wherein the first electronic device is selected from the group consisting of an MOS capacitor, a resistor, an inductor, a charged coupled device, and a light emitting diode.

6. The electronic structure of claim 2, wherein the substrate layer further comprises a second electronic device, and wherein the electronic structure further comprises:

a second damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer, wherein the lower portion of the second damascene conductive wire/stud is conductively coupled to the second electronic device; and

a damascene conductive wiring line within the second insulative layer, wherein the damascene conductive wiring line is above the second damascene conductive wire/stud and is insulatively isolated from the second damascene conductive wire/stud.

7. The electronic structure of claim 6, further comprising a second subtractive etch metallic cap on the upper portion of the second damascene conductive wire/stud and in conductive contact with the second damascene conductive wire/stud.

8. The electronic structure of claim 1, wherein the substrate includes a shallow trench isolation (STI), and wherein the lower portion of the first damascene conductive wire/stud is on the STI.

9. The electronic structure of claim 1, further comprising:

a second subtractive etch metallic cap on the first insulative layer; and

a dual damascene within the second insulative layer such that the dual damascene is above the second subtractive etch metallic cap and is conductively coupled to the second subtractive etch metallic cap.

10. The electronic structure of claim 1, wherein the subtractive etch metallic cap has a thickness between about 50 nm and about 300 nm.

11. The electronic structure of claim 1, wherein the subtractive etch metallic cap includes an electrically conductive material selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, and combinations thereof.

12. The electronic structure of claim 1, wherein the first damascene conductive wire/stud includes an internal seam or void oriented lengthwise within the first damascene conductive wire/stud.

13. The electronic structure of claim 1, wherein the subtractive etch metallic cap includes a first electrically conductive material, and wherein the first damascene conductive wire/stud includes a second electrically conductive material which differs from the first electrically conductive material.

14.The electronic structure of claim 13, wherein the first electrically conductive material is selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, gold, silver, platinum, copper, palladium, alloys thereof, and combinations thereof, and wherein the second electrically conductive material is selected from the group consisting of polysilicon, tungsten, aluminum, copper, tantalum, and

titanium nitride, alloys thereof, and combinations thereof.

29. The electronic structure of claim 1, wherein the subtractive etch metallic cap includes an electrically conductive material selected from the group consisting of tungsten, tantalum, titanium nitride, aluminum with copper doping, tantalum nitride, tungsten nitride, copper, and combinations thereof.

30. The electronic structure of claim 1, wherein the distance between a top surface of the first damascene conductive wire/stud and a top surface of the first insulative layer is between about 100 nm and about 400 nm.

31. The electronic structure of claim 1, wherein the first insulative layer has a thickness that is greater than 250 nm.

32. The electronic structure of claim 1, further comprising a passivating film disposed between the first insulative layer and the second insulative layer.

33. The electronic structure of claim 32, wherein the passivating film is in contact with the subtractive etch metallic cap.

34. The electronic structure of claim 1, wherein the damascene conductive wiring line structure comprises a damascene conductive wiring line and a conductive liner formed on sides of the

damascene conductive wiring line.

35. The electronic structure of claim 1, wherein the damascene conductive wiring line structure together with the subtractive etch mechanical cap and the first damascene conductive wire/stud are adapted to collectively couple the first electronic device to other conductive structure in interlevel dielectric layers which are at or above the damascene conductive wiring line structure.

36. The electronic structure of claim 1, wherein the damascene conductive wiring line structure comprises a dual damascene in contact with the subtractive etch metallic cap.

37. The electronic structure of claim 3, wherein the damascene conductive wiring line structure comprises a dual damascene in contact with the subtractive etch metallic cap.

38. The electronic structure of claim 1, wherein the passivating layer comprises a material selected from the group consisting of silicon nitride and silicon carbide.

39. The electronic structure of claim 1, wherein the first insulation layer comprises a material selected from the group consisting of phososilicate glass and borophososilicate glass.

40. The electronic structure of claim 1, wherein the first insulation layer has a thickness between about 0.2 microns and about 1.5 microns.

41. An electronic structure, comprising:

a substrate layer that includes a first electronic device;

a first insulative layer on the passivating layer and in mechanical contact with the passivating layer, wherein the first insulation layer has a thickness between about 0.2 microns and about 1.5 microns;

a first damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer;

a subtractive etch metallic cap on the upper portion of the first damascene conductive wire/stud and in conductive contact with the first damascene conductive wire/stud;

a second insulative layer on the first insulative layer, wherein the second insulative layer covers the subtractive etch metallic cap; and

a damascene conductive wiring line structure within the second insulative layer such that the damascene conductive wiring line structure is above the subtractive etch metallic cap and is conductively coupled to the subtractive etch metallic cap.

42. An electronic structure, comprising:

a substrate layer that includes a first electronic device;

a first insulative layer on the passivating layer and in mechanical contact with the passivating layer, wherein the first insulation layer comprises a material selected from the group consisting of phososilicate glass and borophososilicate glass;

a first damascene conductive wire/stud having a lower portion in the first insulative layer and an upper portion above the first insulative layer;

a subtractive etch metallic cap on the upper portion of the first damascene conductive wire/stud and in conductive contact with the first damascene conductive wire/stud;

a second insulative layer on the first insulative layer, wherein the second insulative layer covers the subtractive etch metallic cap; and

a damascene conductive wiring line structure within the second insulative layer such that the damascene conductive wiring line structure is above the subtractive etch metallic cap and is conductively coupled to the subtractive etch metallic cap.